# SOUTH SAN JOAQUIN IRRIGATION DISTRICT

# GROUNDWATER MANAGEMENT PLAN

# DECEMBER 1994


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**SOUTH SAN JOAQUIN IRRIGATION DISTRICT**

**GROUNDWATER MANAGEMENT PLAN**

**December 1994**

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# CHAPTER 1 - INTRODUCTION

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## 1. South San Joaquin Irrigation District

The South San Joaquin Irrigation District (SSJID) was formed on May 24, 1909, under the Irrigation District Act (Wright-Bridgeford Act), and chartered by the San Joaquin County Board of Supervisors. Predecessor agencies include the San Joaquin Water Company (1885), and the San Joaquin Canal and Irrigation Company (to 1910). The gross acreage of the District comprises about 72,000 acres.

## 2. Introduction and Authority

This Groundwater Management Plan (Plan) has been prepared in accordance with the requirements of the California Water Code. These requirements are found in Part 2.75, commencing with Section 10750 of Division 6 of the Water Code and are based on Assembly Bill 3030 (AB 3030), passed by the State Legislature in 1992 which became effective on January 1, 1993. The legislation defined 12 elements that may be addressed in a Plan. These elements include:

- Facilitating conjunctive use operations
- Replenishment of groundwater extracted by water producers
- Identification and management of wellhead protection areas and recharge areas
- Construction and operation of groundwater recharge, extraction, storage, conservation, contamination cleanup and water recycling projects
- Monitoring of groundwater levels and storage
- Development of relationships with State and Federal regulatory agencies
- Review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination
- Mitigation of conditions of overdraft
- Identification of well construction policies
- Administration of a well abandonment and well destruction program

- Control of saline water intrusion; and
- Regulation of the migration of contaminated groundwater.

The legislation applies to all groundwater basins identified in the Department of Water Resources (DWR) Bulletin 118, September 1975, except those already subject to groundwater management by a local agency or water master, unless the local agency or water master agrees. SSJID is located within the San Joaquin County Basin and is not subject to prior groundwater management authority. AB 3030 specifically exempted the extraction of groundwater by small wells for domestic purposes.

The first step in initiating a Plan is the conducting of a public hearing, followed by adoption of a resolution of intent to develop a plan. The District held a public hearing regarding the initiation of the process and passed a resolution of intent on May 28, 1993. The legislation requires that the Plan be prepared within two years of the date of adoption of the resolution of intent. If a Plan is not adopted within two years, the resolution expires and the resolution process starts anew.

Following completion of a draft Plan, a second public hearing must be held to consider adoption of the Plan. If a majority of the landowners, i.e., representing more than 50 percent of assessed value of the land subject to groundwater management, protest the adoption of the Plan, the Plan cannot be adopted, and no new Plan can be considered for a period of one year following the public hearing.

If no majority protest occurs, the District may, within 35 days following the public hearing, adopt a resolution or ordinance to implement the Plan.

### 3. Purpose of the Groundwater Management Plan

Groundwater management comprises a range of activities, including:

- Conjunctive use of surface and groundwater resources
- Use of basin storage capacity and basin yield
- Protection of natural recharge and use of artificial recharge; and
- Protection of groundwater quality.

SSJID has historically been responsible for managing the surface water resources of the area. The District, recognizing that surface and groundwater resources are physically linked, identified the need to facilitate actions to protect and maintain the quantity and quality of groundwater in the area. The purpose of this Plan is to describe the activities proposed to

achieve the goal of protecting and maintaining the groundwater in the SSJID area.

**3. Geographic Area of the Plan**

Under the requirements of AB 3030, the District is prohibited from managing the groundwater underlying any other local agency which provides water service, without the agreement of the other agency. The District has a total area of about 72,000 acres, however, contained with the boundary's of SSJID are the Cities of Manteca, Ripon and Escalon. The gross acreage within the three Cities is about 10,000 acres.

This Plan therefore, addresses management of the groundwater resources of the remaining 62,000 acres of the District. Figure 1-1 shows the area within SSJID and the general areas contained within the Cities of Manteca, Ripon and Escalon.

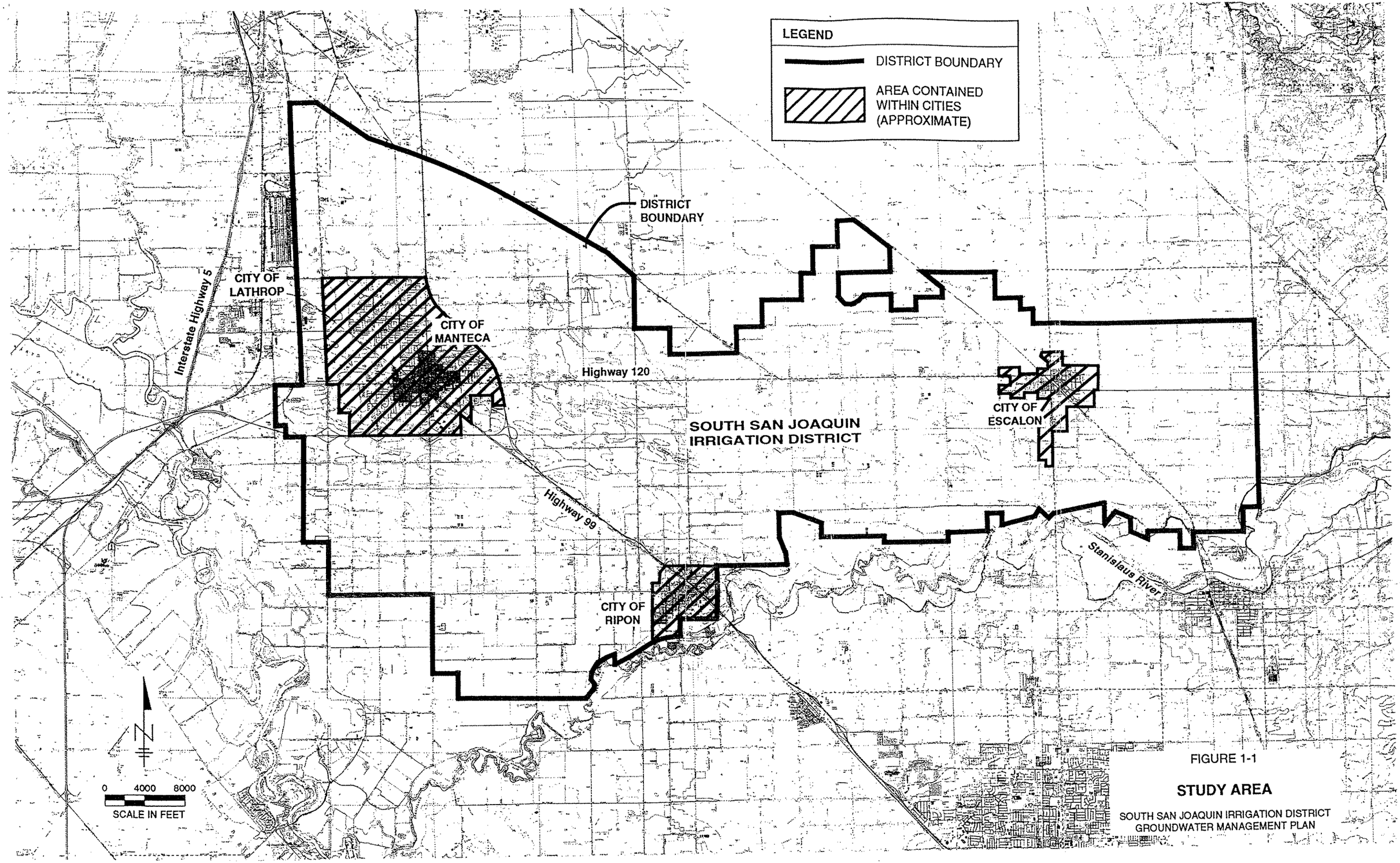



FIGURE 1-1

**STUDY AREA**

SOUTH SAN JOAQUIN IRRIGATION DISTRICT
GROUNDWATER MANAGEMENT PLAN

# CHAPTER 2 - WATER RESOURCES

## CHAPTER 2 - WATER RESOURCES

### 1. Groundwater Basin

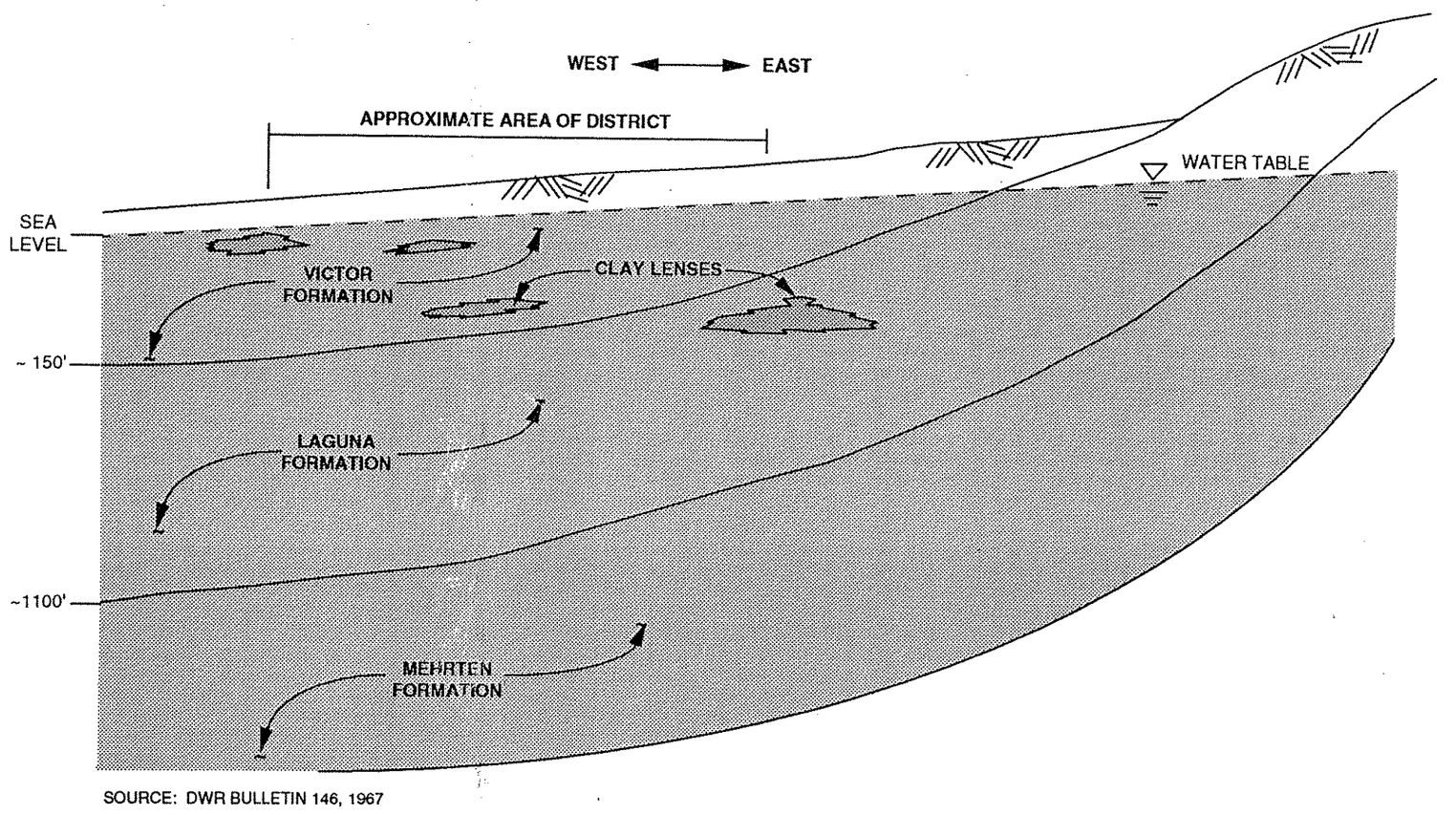
The groundwater underlying SSJID is considered part of the Eastern San Joaquin Groundwater Basin as defined by the California Department of Water Resources in Bulletin 118-80, published in 1980. Although a series of hydrogeologic formations underlie the study area, only three, the Victor, Laguna, and Mehrten Formations, are important to the groundwater supply. The remainder of the formations are technically considered to be non-water bearing. Non-water bearing is used to describe those formations having limited water production capabilities or those containing saline waters of marine origin.

A generalized cross-section of the water bearing formations underlying the District are shown in Figure 2-1. As shown, a number of the formations rise above sea level and become exposed in the area of the foothills. The formations dip downward toward the west.

Within the water bearing formations, only two, the Victor and the Laguna Formations, are being used as a source of fresh water. The Victor Formation, including alluviums, is the uppermost formation beginning at the ground surface and extending to an estimated maximum depth of 150 feet. This formation is characterized by stream deposited sands, gravels, silts and clays. In the western portion of the District, localized layers of clay and silt result in zones of perched water. In general the Victor Formation is coarser grained and more permeable than underlying formations, and as a result, rainfall and surface waters from the District's unlined canals and drains, and streams migrate downward through the Victor Formation and enter the lower formations. Since the Victor Formation is of limited thickness, use of the Victor Formation is believed to be generally limited to agricultural wells and small domestic wells. The larger capacity municipal and industrial wells typically penetrate through this formation into the Laguna Formation.

The Laguna Formation consists of discontinuous lenses of unconsolidated to semi-consolidated sands and silts, interspersed with lesser amounts of clay and gravel. This formation has moderate permeability and is hydraulically connected to the Victor Formation. Within the study area, the Laguna Formation is estimated to be 600 to 1000 feet thick.

Recharge to both formations comes from four general sources: the Stanislaus River, groundwater inflow from the foothills east of SSJID, irrigation and precipitation within SSJID and recharge ponds within SSJID. Ancient stream channel deposits are also found along major stream courses and provide for significant infiltration to the lower formations.




SOURCE: DWR BULLETIN 146, 1967

FIGURE 2-1

**GENERALIZED GEOLOGIC CROSS SECTION**

SOUTH SAN JOAQUIN IRRIGATION DISTRICT
GROUNDWATER MANAGEMENT PLAN

The Mehrten Formation underlies the Laguna Formation and is composed of semi-consolidated to consolidated silts, sands and gravels. Deep wells in the Stockton area have penetrated the Mehrten Formation and found high percentages of fine grained material. Based on this, the formation is believed to have moderate permeability. Within the District, the Mehrten Formation is found about 800 to 1100 feet below the surface and is estimated to be about 600 feet thick. The base of the Mehrten Formation is believed to be the base of the useable groundwater formation. None of the wells in the District are believed to penetrate into this formation.

The Valley Springs Formation lies below the Mehrten Formation, and within San Joaquin County, contains primarily saline water of marine origin. This formation is not used as a water supply.

**2. Estimated Perennial Yield**

The Eastern San Joaquin County Groundwater Study, October 1985, estimated the perennial yield of the groundwater to be 1.0 acre-foot per acre per year, on a county wide basis. Perennial or safe yield is the amount of water that can be extracted from the groundwater, and not produce, on a long term basis, undesirable results such as lowering of the groundwater level or producing saline water intrusion.

The study area (District area minus the area of the Cities) contains about 62,000 acres and, if the county wide estimated yield of 1.0 acre-foot per acre per year is applied, results in an estimated perennial yield of the groundwater within the net District of 62,000 acre-feet annually. However, as the District artificially recharges about 30,000 acre-feet annually into the groundwater, the actual perennial yield may exceed 62,000 acre-feet annually.

**3. Groundwater Usage**

Within SSJID, groundwater is used for both agricultural, and municipal and industrial purposes. The Cities of Manteca, Ripon and Escalon are located within the District and rely on groundwater as the sole source of potable water. Groundwater use for municipal purposes is currently estimated to be about 16,500 acre-feet annually. Annual water usage within the Cities averages about 2.5 acre-feet per acre, exceeding the county wide unit perennial yield. Groundwater levels, in some urban areas, reflect this overdrafting. The change in groundwater levels is especially noticeable around Manteca, where a slight cone of depression is beginning to form.

The City of Lathrop, located adjacent to the western boundary of SSJID, also relies entirely on groundwater. Groundwater levels in the Lathrop area are at or below sea level and some saline water intrusion has been reported.

Rural groundwater usage within SSJID varies from year to year and is estimated to be about 32,400 acre-feet annually. About 11,200 acre-feet of this total is produced from District wells while the remainder is extracted by private wells.

**4. Groundwater Levels**

Semi annual monitoring of groundwater levels throughout San Joaquin County, including SSJID was started in the fall of 1971. Measurements of the water levels are taken during the spring and fall of each year. The spring measurements reflect natural recharge that occurred during the wet season, while the fall measurements indicate the impact of groundwater pumping during the summer months. Within SSJID, a total of 32 wells are monitored. Figure 2-2 shows the location, within SSJID, of the wells used to monitor groundwater levels.

Within the District, groundwater movement is generally from the southeast to the northwest. North of the District, groundwater movement flows northward to the pumping depression located east of Stockton. Since 1964, groundwater levels within the District have declined between 20 and 30 feet, with about 10 feet of this decline occurring between 1987 and 1993, probably as a result of the extended dry conditions during that time. The majority of this decline has occurred in the central and eastern areas of the District as a possible result of the cone of depression east of Stockton. Figure 2-3 shows the groundwater contours measured during the fall of 1993.

**5. Groundwater Quality**

With the exception of wells owned by the Cities, water quality is not monitored in the District. As a result, comparatively little long-term data is available on groundwater quality. The Cities are required by the Department of Health Services to periodically sample and test wells used as a source of potable water. In recent years, wells used by the City of Manteca have shown increasing levels of both inorganic and organic contaminants. The primary inorganic contaminant found in Manteca's wells has been nitrates. Low levels of the organic pesticide Dibromochloropropane (DBCP) have also been found in Manteca's wells.

The City of Ripon's wells have also experienced elevated levels of nitrates, resulting in the closing of several wells. Trace levels of organic contaminants have also been detected in Ripon's wells.

Shallow wells in the Escalon area, i.e., less than 250 to 300 feet in depth, have experienced problems with elevated levels of nitrates and DBCP. To overcome this problem, Escalon has constructed several new wells with depths to 600 feet. No water quality problems have been noted in the new wells operated by the City of Escalon.

Localized areas of groundwater contamination exist in and around the District. Within the District, there are sites where the groundwater has become contaminated due to underground storage tanks leaking gasoline and other petroleum products. Monitoring of these localized contamination problems is the responsibility of the Environmental Health Division of San Joaquin County Health Department.

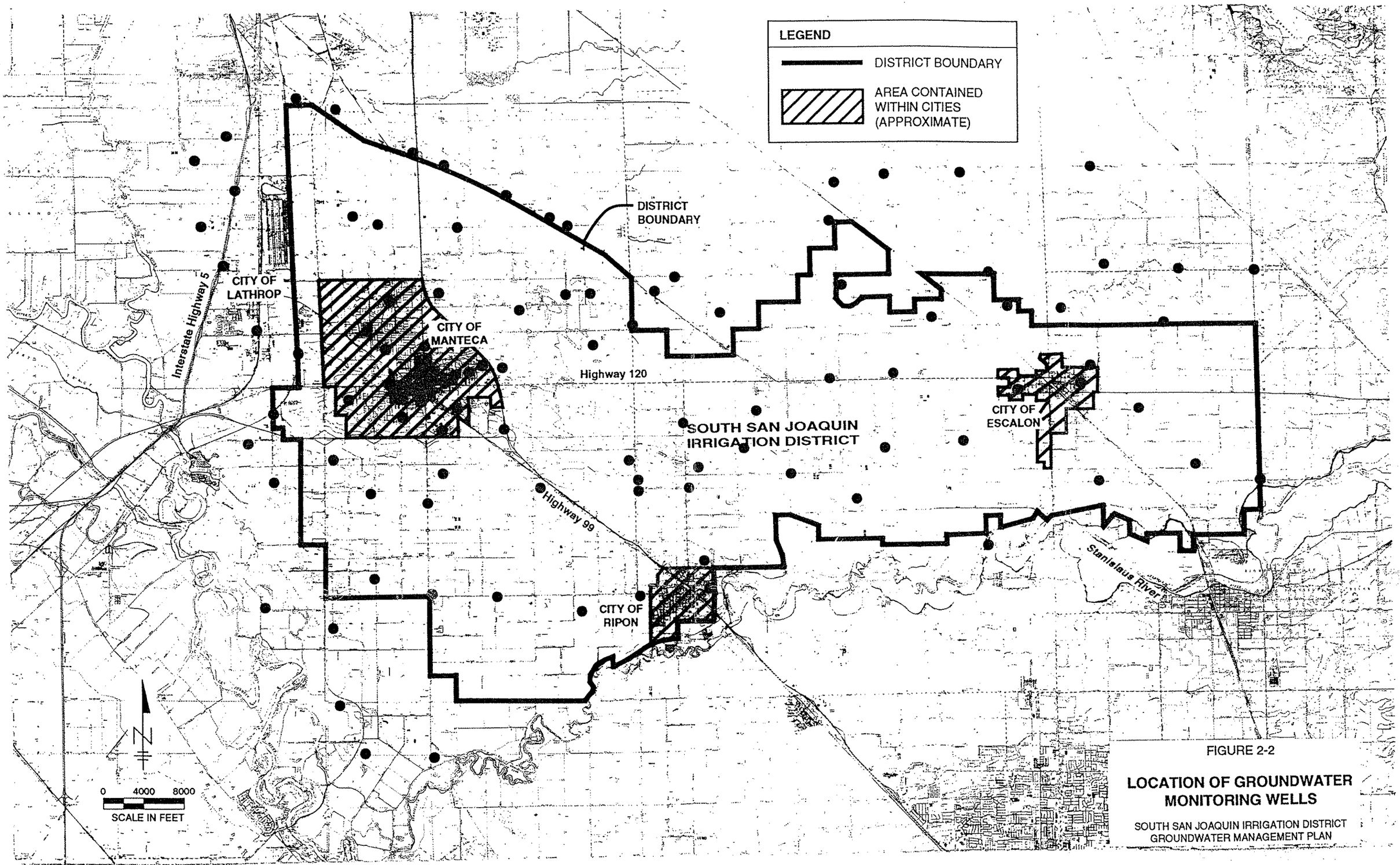



FIGURE 2-2

**LOCATION OF GROUNDWATER MONITORING WELLS**

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GROUNDWATER MANAGEMENT PLAN

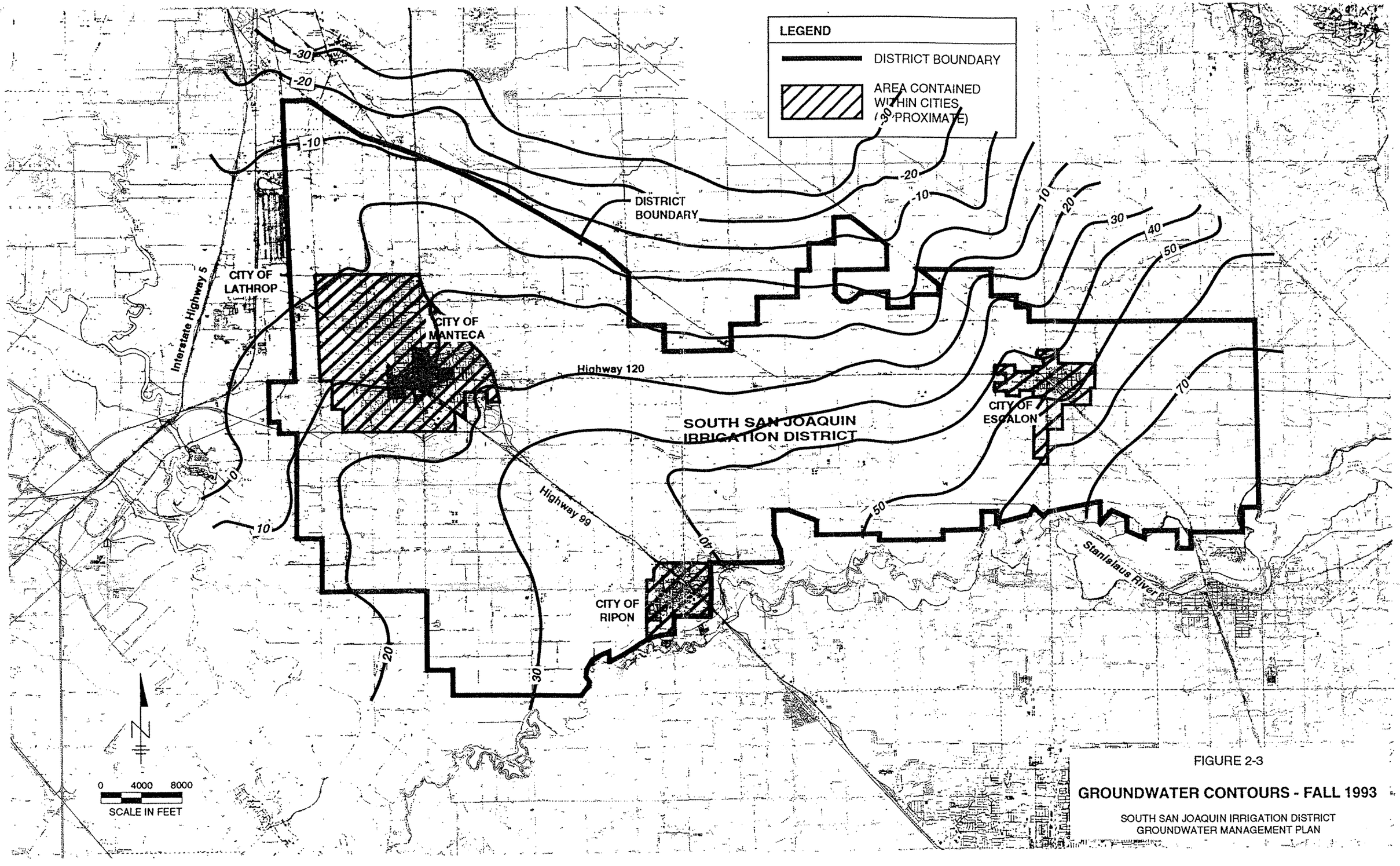


FIGURE 2-3

**GROUNDWATER CONTOURS - FALL 1993**

SOUTH SAN JOAQUIN IRRIGATION DISTRICT
GROUNDWATER MANAGEMENT PLAN

# CHAPTER 3 - DESCRIPTION OF PLAN ACTIVITIES

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The District's objective is to protect the groundwater resources of the area for the continued benefit of the users, both agricultural and urban. To assist in achieving that objective, the District has identified the following activities to be implemented within the District's service area.

### 1. Element No. 1 - Facilitate Conjunctive Use Operations

Conjunctive use means managing the groundwater and surface water to maximize the benefits of all water users. By facilitating conjunctive use within SSJID, several benefits are realized by the residents of the area.

The urban population centers within and adjacent to the District rely entirely on groundwater for potable water supplies. When viewed from an area-wide basis, groundwater extractions for urban uses typically exceed 1.0 acre-feet per acre per year, the published safe yield of the groundwater in eastern San Joaquin County. As the gradual urbanization of District lands continues, overdrafting of the groundwater basin in the urbanized areas is likely to continue unless alternative sources of supply are obtained.

As more land is removed from agricultural production, less surface water is needed for irrigation. Concurrently, more efficient agricultural water management activities are being implemented, further reducing the need for surface water. The result is an imbalance in the utilization of surface and groundwater in the area. Less demand is projected for the more abundant surface water, while increased usage is projected for the already stretched groundwater.

The following activities will be undertaken by SSJID to facilitate conjunctive use in the area of the District:

A. Surface Water Treatment Facilities - To optimize groundwater and surface water use, SSJID has conducted several studies to evaluate supplying treated surface water to the Cities of Manteca, Ripon, Escalon, Lathrop, and Tracy. The surface water would be used to meet a portion of their current and future water needs. Replacing part of the groundwater with surface water in a conjunctive use program will effectively reduce groundwater extraction in the area. It is expected that during wet years, surface water would be the primary source of water for agricultural, and municipal and industrial uses. If available, surface water would also be used to recharge the groundwater. During dry periods, it is anticipated that agriculture would continue to rely on surface water while the Cities would increase

groundwater usage. The District will continue to work toward implementation of this project as long as implementation offers benefits to the residents of the District.

B. Groundwater Management - SSJID operates a series of wells in the western area of the District. A perched water table is known to exist in this area, and the high water table can conflict with agricultural activities in the area. The wells are used to maintain level of the perched water below a level that would negatively affect agricultural operations. Water pumped from these wells is typically discharged to nearby irrigation lines and reused.

The water from these wells has typically been used to supplement surface water deliveries in other areas of the District. Water from these wells could also be used to recharge the groundwater in other areas of the District. The District will evaluate the opportunities for expanded reuse of water pumped from the perched water table. If the reuse is determined to be cost effective, the District will implement a program to reuse this water.

The District will also evaluate, and as appropriate, implement other ways of optimizing overall groundwater and surface water usage within the District boundaries. This could include increased replenishment of groundwater as discussed in Element No. 2 and increased groundwater pumping. The goal of these activities is to actively manage the combined resources for the benefits of the residents of the District.

As an integral part of the District's management responsibility, the District will oppose activities that result in the export of groundwater from within the District to areas outside San Joaquin County.

**2. Element No. 2 - Replenishment of Groundwater Extracted by Producers**

As described in Element No. 1, both agricultural and urban activities in the District rely on groundwater. In some areas, groundwater extraction exceeds the accepted perennial yield. The result of this overdrafting includes the potential for saline water intrusion in some areas, potentially increased groundwater pumping costs and reduction of natural movement toward the north. Artificially recharging the groundwater basin provides a benefit to groundwater users within SSJID, while allowing the District to fully use its surface water entitlement.

Currently, artificial replenishment of the groundwater by SSJID occurs as an ancillary result of other activities. Woodward Reservoir is an unlined 36,000 acre-foot off-stream storage facility and water from the reservoir percolates into the groundwater. The annual groundwater recharge from Woodward Reservoir is estimated to be 20,000 acre-feet.

During irrigation season, typically March 15 to October 15, water from Woodward Reservoir flows into the 18 mile long Main Distribution Canal (MDC) which conveys water to each lateral. The MDC is unlined throughout its length. The District also operates a 100 acre-foot

capacity unlined terminal reservoir, located adjacent to the Main Distribution Canal between Carrolton Road and Van Allen Road. Annual groundwater recharge from the MDC and the terminal reservoir is estimated to exceed 10,000 acre-feet.

Besides the proposed activities to reduce groundwater extraction described in Element No. 1, additional activities have been identified to increase recharge of the groundwater. These activities are described below:

A. Use of District Facilities - During the non-irrigation season, the MDC and terminal reservoir have been dewatered for cleaning and maintenance. During part of the non-irrigation season, the MDC and terminal reservoir can be used to recharge the groundwater and dewatered during limited periods for cleaning and maintenance activities. This will require careful scheduling of maintenance activities. The District will evaluate the opportunities and constraints associated with using the MDC and terminal reservoir during the non-irrigation season, during normal and wet years, for recharge of available surface water. If this is determined to be feasible, the District will implement a program of artificial groundwater recharge using the MDC and terminal reservoir.

B. Use of Selected Agricultural Sites - Certain sites within the District, currently used for agricultural activities, are believed to have good percolation potential. Depending on cropping patterns and other agricultural considerations, it may be possible to use these sites for both crop production and recharge activities. During the irrigation season, available water above that normally scheduled could be applied to the selected sites and allowed to percolate into the groundwater. During the non-irrigation season of normal and wet years, water deliveries strictly for recharge could be applied.

The District will, in cooperation with individual growers, evaluate the feasibility of establishing such recharge activities. Consideration will be given to the water quality implications of the proposed activity to ensure that agricultural chemicals and fertilizers are not carried into the groundwater. If the evaluations indicate this to be a beneficial approach for recharging the groundwater, recharge agreements with growers will be established and a recharge program initiated.

C. Establishment of Permanent Recharge Areas - As described in B above, certain areas in the District are informally known to have high recharge potential. Within these areas, it may be feasible to establish permanent recharge areas. When surface water is available, these areas would be used to recharge groundwater. During other times, the areas could be used for other activities, recreation for example, which would not negatively affect the primary purpose of the sites. The District will evaluate the opportunities and constraints associated with establishing permanent recharge sites in the District. If the evaluations determine that establishment of permanent recharge areas is cost effective and of community benefit, the program will be initiated.

## 3. Element No. 3 - Regulation and Management of Recharge and Wellhead Protection Areas

The purpose of a recharge and wellhead protection area is to establish a protective zone around wells, well fields, and recharge areas to minimize the possibility of surface contamination reaching the groundwater. The groundwater recharged from Woodward Reservoir, MDC and terminal reservoir is partially protected against contamination due to SSJID's current regulations on discharging of hazardous and toxic wastes into the canal.

Potential loss of recharge areas due to residential, commercial or industrial development is also a consideration in the development of a protection program. Protection is typically accomplished by managing the land use activities occurring within the protection area. As SSJID is not directly responsible for land use decisions, management must be accomplished through joint efforts with the appropriate land use planning agency. Within SSJID, San Joaquin County is responsible for land use activities in the unincorporated areas of the District, while the Cities of Manteca, Ripon, Escalon are responsible for the areas within their respective jurisdictions. Additionally, land use activities within Lathrop, although not within SSJID, could have an effect on the groundwater under SSJID.

Elements in the development of a wellhead and recharge protection program include delineation of the areas to be protected, based on hydrogeologic conditions. Identification must be made of any existing or potential sources of contamination in the proposed protection area.

To complement Elements No. 1 and 2, the following activities will be undertaken to protect and manage recharge and wellhead areas:

A. Coordination with Land Use Agencies - As described in Element No. 7, SSJID will work in concert with local land use planning agencies to minimize land use activities that have the potential to contaminate the groundwater. SSJID will also work with these agencies to avoid or minimize the loss of groundwater recharge areas. Activities under this may include evaluations of hydrogeological conditions to identify those areas having a high recharge potential.

B. Establishment of Permanent Recharge Areas - As discussed in Element No. 2B, certain areas in the District are believed to have high recharge potential. If permanent recharge areas are established, the District will develop procedures regarding appropriate land use activities on these sites to ensure protection of the groundwater.

**4. Element No. 4 - Monitoring of Groundwater Levels and Storage**

One element of groundwater management is the monitoring of water levels and water quality. Purposes for monitoring the groundwater level include determining the effects of recharge and extraction activities as well as estimating the amount of water in storage. Using the results of water level monitoring, modifications to extraction and recharge activities can be made to provide optimum use of the groundwater. In eastern San Joaquin County, several local, State and Federal agencies monitor groundwater levels in selected wells during the spring and fall. The information collected is compiled and distributed in a biannual report by the San Joaquin County Flood Control and Water Conservation District (SJFCWCD).

Spring levels provide an indication of the increase in groundwater storage that has occurred during the preceding winter as a result of precipitation and reduced pumping. Fall levels provide an indication of the reduction in groundwater storage because of pumping during the summer. Within SSJID, a total of 32 wells are monitored.

Monitoring of groundwater quality can be used to detect changes in water quality resulting from man made contamination or natural phenomena. Water quality in the municipal wells within the District are routinely monitored according to the requirements of the California Department of Health Services and the California Water Code and this information is available from several sources. Private domestic and irrigation wells in the unincorporated areas of SSJID are not routinely monitored for water quality parameters.

With regard to groundwater monitoring, SSJID will undertake the following activities:

A. Support On-Going Monitoring Activities - The SJCFCWCD compiles water level information from about 32 wells within SSJID. The District will continue to actively support the water level monitoring activities of the SJCFCWCD. This support will include working with the SJCFCWCD to evaluate the effectiveness of the current monitoring program.

B. Additional Water Level Data Collection - If it is determined by the District that the current level of water level monitoring within SSJID is not adequate for groundwater management, the District will evaluate implementing additional monitoring activities.

C. Water Quality Monitoring - Currently, scheduled water quality monitoring is only conducted on the municipal wells. SSJID will evaluate the water quality parameters currently being monitored and determine if selected water quality monitoring should be conducted in the unincorporated of the District. If it is determined that selected water quality monitoring is needed, the District will implement a program.

D. Computer Modeling of the Groundwater System - Computer modeling of the groundwater system is used by many agencies as a management tool. A computer model can simulate proposed extraction and recharge activities, and allow selection of the best apparent approach

to maximize beneficial use of the groundwater. A computer model can also simulate the movement of contaminants within the groundwater thereby improving the cleanup or containment of the contaminant. Currently, the SJCFCWCD and the California Department of Water Resources have computer models of the County that could be adapted to meet the specific needs of SSJID. As part of its management activities, SSJID may evaluate the need for a computer model and, if it is determined that a model is needed, the District will initiate a modeling program. As part of the implementation, the District will evaluate the applicability of the existing county groundwater models.

**5. Element No. 5 - Construction and Operation of Groundwater Recharge, Extraction, Conservation, and Water Recycling Programs**

SSJID currently operates both groundwater recharge and extraction facilities. Future projects may, as part of the Groundwater Management Plan, expand these operations. The District may, as part of its groundwater management responsibilities, choose to sponsor water conservation, and water recycling programs.

**6. Element No. 6 - Development of Relationships with Local, State and Federal Agencies**

SSJID, as the surface water purveyor for the area, has established good working relationships with those local, State and Federal agencies having an interest in and/or regulatory responsibility for water resources. The existing relationships will continue and likely expand as the District implements groundwater management activities. Other water related activities being considered by the District, such as the surface water treatment facilities, will bring SSJID into contact with other local, State and Federal agencies, such as the California Department of Health Services. The District is committed to maintaining relationships with all local, State and Federal agencies having interests in water resource management.

**7. Element No. 7 - Review of Land Use Plans and Coordination with Land Use Planning Agencies to Assess Activities which Create a Reasonable Risk of Groundwater Contamination**

The District reviews and evaluates all proposed land use activities in the unincorporated areas of SSJID. This review and evaluation is done through San Joaquin County, with the intent of identifying all activities potentially in conflict with the goals of SSJID. The District will continue this practice.

To date, SSJID has not established formal relationships with the nearby Cities to review and evaluate proposed land use activities. As land use activities can have effects that extend

beyond the political boundaries, SSJID will initiate a program of working with the Cities of Manteca, Ripon, Escalon and Lathrop to review and evaluate proposed land use activities. Comments will be made regarding any activities that create a reasonable risk of contaminating the water resources of the area.

**8. Element No. 8 - Mitigation of Overdraft**

California Department of Water Resources Bulletin 118 has identified the groundwater basin underlying eastern San Joaquin County as a critically overdrafted basin. The Eastern San Joaquin County Groundwater Study prepared by San Joaquin County has identified an annual overdraft of about 270,000 acre-feet in the eastern area of the County. The most visible effect of the overdraft is the major cone of depression located in central San Joaquin County, east of the City of Stockton. The study also estimated the safe yield of the eastern area of the County to be 1.0 acre-feet per acre per year. San Joaquin County has established a goal of reducing groundwater overdraft and stabilizing groundwater levels.

However, while groundwater extraction in the urban areas of SSJID area exceed the estimated safe yield, groundwater usage in the agricultural areas is significantly below the 1.0 acre-foot per acre per year. As a result, the average extraction rate within SSJID is less than the estimated safe yield and therefore, the District's portion of the groundwater basin is, technically, not overdrafted. The District also artificially recharges the groundwater basin through surface water operations.

Groundwater usage in the area north of the District is, however, significantly in excess of 1.0 acre-foot per acre per year, The effects of this higher than safe yield extractions has, as yet, not resulted in a significant decrease in groundwater levels in the SSJID area. However, continued overdrafting of the groundwater, especially in to the north, has the potential to negatively affect the groundwater resources of the District.

As discussed in Element No. 1, the District is actively implementing treated surface water deliveries to the Cities in and adjacent to the District, with the goal of optimizing groundwater and surface water usage. Additionally, with regard to the overdrafted areas to the north, the District will support responsible agencies in the overdrafted area with; 1) implementing best water management practices; 2) obtaining supplemental supplies from reasonable and feasible sources, and 3) implementing beneficial use of reclaimed wastewater.

**9. Element No. 9 - Identification of Well Construction Policies**

Wells that are not properly constructed can serve as conduits, allowing contamination from the surface or shallow aquifers to migrate to the groundwater. A properly constructed well can also minimize contaminant movement between aquifers. Sections 13700 through 13806 of

the California Water Code requires all water wells to meet certain minimum standards. Department of Water Resources Bulletins 74-81 and 74-90 describe these minimum standards. San Joaquin County has adopted water well construction standards that are more restrictive than those contained in Bulletins 74-81 and 74-90. A County permit is required before constructing any water well and the County inspects the wells during construction to confirm conformance with the standards.

SSJID supports these activities and will continue to cooperate with San Joaquin County in the application of the regulations. SSJID will provide information on the water well regulations to all interested parties in the District.

**10. Element No. 10 - Administration of a Well Abandonment and Well Destruction Program**

Wells whose original purpose and use have been permanently discontinued or that are in such a state of disrepair that they cannot be used for their original purpose are considered abandoned. Wells that are not properly destroyed can serve as conduits, allowing contamination from the surface or shallow aquifers to migrate to the groundwater. By regulation, all abandoned wells within San Joaquin County must be destroyed. Acceptable methods of well destruction are described in the County Well Standards. The County inspects the wells during destruction to confirm conformance with the standards.

SSJID supports these activities and will continue to cooperate with San Joaquin County in the application of the regulations. SSJID will provide information on the water well regulations to all interested parties in the District.

**11. Element No. 11 - Control of Saline Water Intrusion**

Saline water intrusion can contaminate groundwater supplies, making the water unusable for agricultural and domestic purposes. In southern San Joaquin County, saline water intrusion from the Sacramento-San Joaquin Delta could occur if the groundwater level adjacent to the Delta fall below the water level in the Delta. This situation is occurring in the Stockton area and the early stages of saline water intrusion may be occurring in the Lathrop area. If left to continue, saline water intrusion could begin to contaminate the groundwater underlying SSJID.

The activities proposed in Elements No. 1, 2, 4, 5 and 6 are expected to inhibit saline water intrusion into the SSJID area. If the proposed activities are not successful in controlling saline water intrusion, the District will identify and evaluate additional activities that may be needed.

## 12. Element No. 12 - Regulation of the Migration of Contaminated Groundwater

Contamination can render the groundwater unusable for agricultural, and municipal and industrial purposes. Currently the responsibility for regulating and controlling the migration of and cleanup of contaminated groundwater rests with local, State and Federal agencies. Within San Joaquin County, the Environmental Health Division is the responsible agency.

SSJID supports the on-going activities of the local, State and Federal agencies to control the migration of and cleanup of contaminated groundwater and will assist these agencies in their efforts.

# CHAPTER 4 - SCHEDULE AND BUDGET

## CHAPTER 4 - SCHEDULE AND BUDGET

### 1. Schedule of Activities

Table 4-1 presents a summary schedule of the activities described in Chapter 3. The schedule was developed to be a guide to implementation to illustrate a logical progression of activities both within an element, and among the various elements. Several of the elements and activities, such as Element 1A, and Elements 9, 10 and 12 are already being implemented as part of the on-going activities of the District. Other activities and elements may be initiated within 3 to 6 months after adoption of the Plan. However, while the schedule is intended to l be used as a guide, the District may modify the implementation schedule to more effectively manage the water resources of the District.

### 2. Program Budget

Table 4-2 presents a preliminary 3-year program budget for implementing the Plan. The identified costs include the value of District staff time allocated to specific elements, the estimated value of easements and lands used for groundwater recharge, and water quality testing by outside laboratories. The District will, on an annual basis, evaluate the need for specific expenditures to implement the Plan.

| DESCRIPTION | MONTHS AFTER PLAN ADOPTION (0, 6, 12, 18, 24, 30, 36) |
|---|---|
| **Element 1 Facilitate Conjunctive Use Operations**<br>Surface Water Treatment Facilities<br>Groundwater Management | On-Going Activity |
| **Element 2 Replenishment of Groundwater**<br>Use of District Facilities<br>Use of Selected Agricultural Sites<br>Establish Permanent Recharge Areas (10 ac. per year) | During Non-Irrigation Season |
| **Element 3 Regulation & Management of Recharge & Wellhead Areas**<br>Coordination with Land Use Agencies<br>Establish Permanent Recharge Areas | |
| **Element 4 Monitoring of Groundwater Levels**<br>Support On-Going Monitoring Activities<br>Additional Water Level Data Collection<br>Water Quality Monitoring<br>Computer Model of Groundwater System | |
| **Element 5 Construction & Operation of Recharge & Extraction Programs** | Included in Other Elements |
| **Element 6 Development of Relationships with Local, State & Federal Agencies** | Included in Other Elements |
| **Element 7 Coordination with Land Use Planning Agencies** | |
| **Element 8 Mitigation of Overdraft** | Included in Other Elements |
| **Element 9 Well Construction Policies** | On-Going Activity |
| **Element 10 Well Abandonment & Well Destruction Program** | On-Going Activity |
| **Element 11 Control of Saline Water Intrusion** | Included in Other Elements |
| **Element 12 Regulation of Contaminated Groundwater** | On-Going Activity |

TABLE 4-1

**SUMMARY IMPLEMENTATION SCHEDULE**

SOUTH SAN JOAQUIN IRRIGATION DISTRICT
GROUNDWATER MANAGEMENT PLAN

Table 4-2
Annual Costs to Implement
Groundwater Management Plan
South San Joaquin Irrigation District

| Description | Years after Plan Adoption Year # 1 | Year # 2 | Year # 3 | Total |
|---|---|---|---|---|
| **Element # 1 - Facilitate Conjunctive Use Operations** | | | | |
| Surface Water System (1) | | Current Activity of District | | |
| Reuse/Recharge Perched Groundwater (1) | $15,000 | $25,000 | $25,000 | $65,000 |
| **Element # 2 - Replenishment of Groundwater** | | | | |
| Use of District Facilities | $2,000 | $2,000 | $2,000 | $6,000 |
| Use of Selected Agricultural Sites | $2,500 | $1,000 | $1,000 | $4,500 |
| Establish Permanent Recharge Areas (10 ac. per year) (2) | $300,000 | $300,000 | $300,000 | $900,000 |

| | | | | |
|---|---|---|---|---|
| **Element # 3 - Regulation & Management of Recharge & Wellhead Areas** | | | | |
| Coordination with Land Use Agencies | $5,000 | $3,000 | $3,000 | $11,000 |
| Establish Permanent Recharge Areas | $75,000 | $150,000 | $0 | $225,000 |
| **Element # 4 - Monitoring of Groundwater Levels** | | | | |
| Expand County's monitoring program within District (3) | $3,000 | $3,000 | $3,000 | $9,000 |
| Expand Monitoring Well network | $0 | $18,000 | $25,000 | $43,000 |
| Water Quality Monitoring | | $1,800 | $1,800 | $3,600 |
| Develop Computer Model of Groundwater System (1) | | | $150,000 | $150,000 |
| **Element # 5 - Construction & Operation of Recharge & Extraction Programs** | | Costs included in other Elements | | |
| **Element #6 - Development of Relationships with local, State & Federal Agencies** | | Costs included in other Elements | | |
| **Element # 7 - Coordination with Land Use Planning Agencies** | $12,500 | $12,500 | $12,500 | $37,500 |

| | | | | | |
|---|---|---|---|---|---|
| **Element # 8 - Mitigation of Overdraft** | | | Costs included in other Elements | | |
| **Element # 9 - Well Construction Policies** | | | Current Activity of District | | |
| **Element # 10 - Well Abandonment & Well Destruction Program** | | | Current Activity of District | | |
| **Element # 11 - Control of Saline Water Intrusion** | | | Costs included in other Elements | | |
| **Element # 12 - Regulation of Contaminated Groundwater** | | | Current Activity of District | | |
| | Total | $415,000 | $516,300 | $523,300 | $1,454,600 |

Notes
1) Costs reimbursable by others
2) Costs may be reimbursable by others
3) Based on expanded use of current monitoring program

# South San Joaquin Irrigation District

*Draft Report*

## *Groundwater Management Database Development*

August 1993

MONTGOMERY WATSON

## TABLE OF CONTENTS

## SECTION 1 INTRODUCTION

South San Joaquin Irrigation District (SSJID) is committed to effectively managing the water resources within its service area to meet current and future water needs, including agricultural, municipal, industrial, and environmental. Groundwater is a major component of the overall water resources and this project is a step in SSJID's program of effectively managing surface and groundwater to maximize beneficial uses.

### Scope

This report summarizes the work completed for the Phase 1 of the scope of work approved by the District on April 15, 1993. The tasks in Phase 1 include:

- Identifying groundwater related materials, and collect samples of the available data.
- Completing a reconnaissance level groundwater investigation which identifies recent water levels, major areas of recharge and groundwater pumping.
- Developing a reconnaissance level annual water budget based on available information.

### Background

South San Joaquin Irrigation District (SSJID) is located on the east side of the San Joaquin Valley. The District encompasses about 72,000 acres of predominately agricultural lands with almonds and grapes as the primary crops. Urban areas within SSJID cover about 10 percent of the total area and include the Cities of Manteca, Escalon, and Ripon. During the past 15 years, the District has undergone substantial urbanization and it is projected that at buildout, estimated to occur around the year 2025, urban areas will comprise over 35 percent of the District.

The District has a firm supply of surface water, based on its very senior water rights in the Stanislaus River and its service agreement with the Bureau of Reclamation. Currently SSJID has the right to use up to 300,000 acre-feet of Stanislaus River water annually. This surface water supply has historically been used to meet agricultural water demands. Groundwater has also been used by some agricultural irrigators in lieu of surface water and this usage has averaged 26,000 acre-feet annually. Preliminary estimates of the annual safe yield of the groundwater underlying SSJID area is about 72,000 acre-feet.

The urban areas are entirely reliant on groundwater and in 1989, urban water use was estimated at 16,670 acre-feet. This urban demand is estimated to increase to over 58,000 acre-feet at buildout.

Lands to the north of the District, in the central portion of the county are experiencing significant groundwater overdraft as a result of intensive groundwater pumping to meet agricultural and municipal/industrial demands and this has resulted in the lowering of the groundwater levels along SSJID's northern boundary.

### Purpose

The purpose of this study is to identify the available data and assess future data requirements to develop a groundwater management plan. The primary benefit of

implementing groundwater management is the knowledge and ability to manage conjunctively the surface and groundwater resources within SSJID service areas and to achieve the most beneficial use possible.

The project was initiated in response to Assembly Bill 3030 (AB3030), which became law on January 1,1993; and provides the mechanism by which districts can manage the groundwater resources within their respective service areas. On May 28, 1993 the District filed a Resolution of Intention to adopt a Groundwater Management Plan (GMP). As stated in AB3030 the District has 2 years from this date to adopt the GMP. This report presents the findings of study in the following sections.

Section 2 of this report identifies the groundwater data available to the District. Section 3 reviews the present groundwater conditions within the District including water levels, extraction areas, and recharge areas. Section 4 summarizes the reconnaissance level water budget prepared from the available data. Section 5 includes a review of pertinent activities necessary to complete a groundwater management plan by May 28, 1995.

## SECTION 2 DATA AVAILABILITY

This section describes the groundwater related data available from various federal, state, and local agencies for the area in and around SSJID. Some of the data identified during this phase was collected at the same time. The data requested was for the period 1970-present. This period of record was chosen because it would provide a good background of the data available and include periods of normal and drought conditions. The following describes the data requested and purpose.

### Data Requested

The following list identifies data requested from various agencies and its purpose in the project.

- An AutoCAD base map was provided by SSJID to develop the spring and fall 1992 water levels. This map file will be returned to the District and will be used for future mapping projects by the District.
- A location map of the all the active and abandoned wells was requested to identify the well distribution within SSJID. This is needed to determine how changes in groundwater production are impacting groundwater conditions.
- Well logs, Electric-logs, drillers logs and any additional well construction data is needed to identify perforation intervals and local hydrogeology.
- Water level maps and well hydrographs are needed to identify groundwater storage conditions throughout the service area.
- Pump tests were requested for the wells to determine how efficiently each well is operating. This information is used to identify optimum well field operations and well service and replacement schedules. Operating wells efficiently reduces the energy consumption from pumping.

- Groundwater production data is needed to develop the water budget. It is also used to identify changes in groundwater use patterns over time and associate those changes to related events such as drought or changing cropping patterns.
- Groundwater quality data provides baseline information against which changes in future groundwater quality can be compared.
- Any additional hydrogeologic information, reports, or cross-sections provides additional background information for the area.
- Surface water diversion data was requested from SSJID for development of the water budget.
- Land use, crop use and agricultural water use data was request from SSJID for use in the water budget.

County, State, and Federal agencies were contacted in regard to the specific type of data they provide. Descriptions of the data available and collected is included in the Data Received section.

## Data Received

The following paragraphs describe the data received from the agencies contacted.

**South San Joaquin Irrigation District** South San Joaquin Irrigation District has a partial set of groundwater related data. A Water Conservation Information Report, which was prepared by UMA Engineering in December 1989 for the District, includes extensive data for the 1980 to 1988 study period. Much of this data was incorporated in the water budget.

The District provided an AutoCAD drawing file that included the entire San Joaquin County. When returned to the District, the drawing file of the county will include two additional layers, one each of the spring and fall 1992 water level elevations for the District area. The water level elevation data was obtained from the Semi-Annual Groundwater Reports produced by San Joaquin County Flood Control and Water Conservation District.

The well location map provided by the District includes the District's 33 wells. All the wells are located in the western third of the District. The map also includes the map includes all the lines and stations, drains, and check structures. Groundwater pumping data for the 1992 season was provided by the District. Pump tests were conducted by PG&E on 27 District owned wells in 1992. These tests identify the overall plant efficiency for each well and include recommendations aimed at improving the efficiency.

Surface water diversion data was provided from 1960 to present. Monthly diversions were recorded as Main Supply Canal Inflow to Woodward Reservoir.

Crop data was available in three different formats between 1960 and 1992. From 1960 to 1985, crop acreage's were tabulated by crop type. From 1985 to 1988, crop acreage's were provided on Crop Production and Water Utilization Data forms provided by USBR. From 1990 to 1992 crop data was provided by crop type within each Division. No crop

acreage data is available for 1961 and 1989. Crop acreage for 1985 was available in both of the first two formats.

The District receives the monthly National Pollution Discharge Elimination System (NPDES) report provided by the Defense Logistic Agency to the State Water Resources Control Board. The progress report summarizes the months remediation activities at Sharpe Army Depot just west of SSJID. Water quality problems at this site may impact future groundwater development in the area.

**City of Manteca** The City of Manteca has provided data regarding its 15 municipal wells in the city. Well logs, pump tests, and water quality data were provided for each of the 12 active wells; the 3 other wells are in the process of being abandoned. A single geologic cross-section was provided, but it is not accompanied by the original report or a location map. Copies of the collected data are included in the Appendix of this report.

**City of Lathrop** The City of Lathrop provided a memo regarding the ground water monitoring program describing the present monitoring activities taking place in and around the City of Lathrop. Water quality data is available for four of the City's wells. Copies of the collected data are included in the appendix of this report.

**City of Escalon** The City of Escalon provided a table of their ground water sources in 1990 that includes limited construction data for seven wells. A second table includes total groundwater production for city's wells. The seven wells are identified on the City's well location map. Copies of the collected data are included in the Appendix of this report.

**City of Ripon** The City of Ripon provided well logs, well construction data and production data, and water quality data for 7 wells which are identified on a well location map. Copies of the collected data are included in the appendix of this report.

**San Joaquin County Flood Control and Water Conservation District**. San Joaquin County Flood Control and Water Conservation District (SJCFCWCD) has produced a Semi-Annual Ground water Report since Fall 1971 when it began monitoring ground water levels and ground water quality. The semi-annual report includes a depth to water map and a water level elevation map for the unconfined and semi-confined aquifer. Water quality is monitored along a north-south line from the City of Stockton to the City of Lathrop and is published in the Fall reports.

Spring and fall depth to water and water level elevation maps were collected for 1985, 1991 and 1992. A location map showing the wells that are monitored was also provided. Copies of the collected data is included in the Appendix of this report.

**San Joaquin County Public Health Services, Environmental Health Division** The Environmental Health Division is responsible for the Site Mitigation Database. The database contains information about all the known hazardous materials contamination sites within the county. The database contains the location of the site as well as the type of contamination(soil or groundwater) and the contaminants present(identified by code). The database is available for public review. A sample printout from the database showing the type of data available for each identified site is included in the Appendix of this report.

The Environmental Health Division is also responsible for well construction and destruction standards for San Joaquin County. The County has its own Well Standards which are more stringent than the existing California Department of Water Resources standards. In addition, the Environmental Health Services Division is responsible for monitoring the destruction of abandoned wells. Information regarding well construction or well abandonment permits can be obtained by the public. The data is stored on microfiche by the physical address of the well. A copy of the county well standards are included in the Appendix of this report.

**California Department of Water Resources** Two of the California Department of Water Resources (DWR) many responsibilities are to investigate the overall quality of California's water resource, and assist local water agencies with funds, expertise, and technical support to improve their water delivery systems and meet the increasing demands of their communities. SSJID is located in DWR's Central District.

According to the files at the Central District, there are approximately 1300 well logs on file within SSJID. Most of these are small domestic wells. Two sample well logs are included in the Appendix of this report.

DWR Bulletin 230-81, *Index to Sources of Hydrologic Data* , December 1981, summarizes statewide information on sources of water-resource and climatic data. Bulletin 230-81 identifies stream flow, precipitation, and surface and groundwater quality stations in the state as of that date.

The California Department of Water Resources Office of Water Conservation operates the CIMIS(California Irrigation Management Information System) program. CIMIS collects precipitation, soil and air temperature, wind speed and direction, solar radiation, and relative humidity data and computes the "reference evapotranspiration". Local irrigators can use the reference evapotranspiration for their area to determine the optimum irrigation schedules. There are over 100 CIMIS stations located throughout California. The two stations closest to the District are in Manteca and Modesto. This information can be used by irrigators to predict crop water needs and adjust irrigation schedules appropriately thereby using available water more efficiently.

The California Department of Water Resources has several reports that include the areas encompassed by South San Joaquin Irrigation District. The *San Joaquin County Ground Water Investigation*, Bulletin 146, published in July 1967 includes soils data, geologic data and aquifer data of the areas within the SSJID. The DWR Central District published *Historical Ground Water Levels in San Joaquin County* in April 1990. It includes well hydrographs for over 130 wells in San Joaquin County. *Groundwater Basins in California*, Bulletin 118-80, identifies all the groundwater basins within the state, including those subject to critical conditions of overdraft or with special problems.

The Department of Water Resources and the United States Bureau of Reclamation are jointly involved in the Stanislaus River Basin and Calaveras River Water Use Program. Work on this project includes groundwater modeling in San Joaquin County, surface water modeling of the San Joaquin River System, and water demand studies in Calaveras, Tuolumne and San Joaquin Counties.

**National Oceanographic and Atmospheric Administration** The National Oceanographic and Atmospheric Administration (NOAA) provides complete precipitation data at various stations throughout California. The data is published in monthly and annual reports. The nearest NOAA stations to SSJID are in Stockton and

Modesto. A sample of the data from the annual report is included in the appendix of this report.

**Soil Conservation Service** The Soil Conservation Service updated the Soil Survey of San Joaquin County in October 1992. These surveys include 1:24,000 scale orthophotographs with the soil mapping units delineated upon it. The survey includes a report describing each of the mapping units as well as the hydrologic soil group. The hydrologic soil groups are used to identify potential areas of groundwater recharge. A copy of the General Soil Map is included in the Appendix of this report.

**United States Geological Survey** The United States Geological Survey was contacted regarding any work they have completed in the southern part of San Joaquin County. All work completed by the USGS in the area has been published Several USGS reports that include South San Joaquin Irrigation District have been published.. Professional Paper 1401-C, *Geology of the Fresh Ground-Water Basin, Central Valley, California*, includes groundwater and geology information about the San Joaquin Valley. Water Supply Paper 1469, *Groundwater Conditions and Storage Capacity in the San Joaquin Valley, California*, includes some hydrogeology data about the District area. The USGS in cooperation with DWR publishes stream flow data in annual reports titled *Water Resources Data, California.*

**United States Bureau of Reclamation** The United States Bureau of Reclamation has completed some work within the District. All of the information obtained is from unpublished reports. A copy of the data collected is included in the Appendix of this report.

**California State Regional Water Quality Control Board** One of the functions of the California State Regional Water Quality Control Board(RWQCB) is to protect both surface and groundwater quality. Each Regional Board is responsible for monitoring hazardous waste sites and remediation activities within its region. There are nine Regional Boards in the State. SSJID is in Region 5, the Central Valley Region. The Central Valley Regional Board office in Sacramento was contacted regarding 2 hazardous waste sites in southern San Joaquin County. The Nestle Beverage Company and the Simpson Paper Company are both located near the City of Ripon along the southern boundary of the District. Numerous reports have been filed with the RWQCB for both sites. A copy of the Annual Report for the Nestle Beverage Company was collected and a copy is included in the Appendix. The Simpson Paper Company reports were not as accessible, so only copies of the cover pages of the reports are included in the Appendix.

## Data Availability Summary

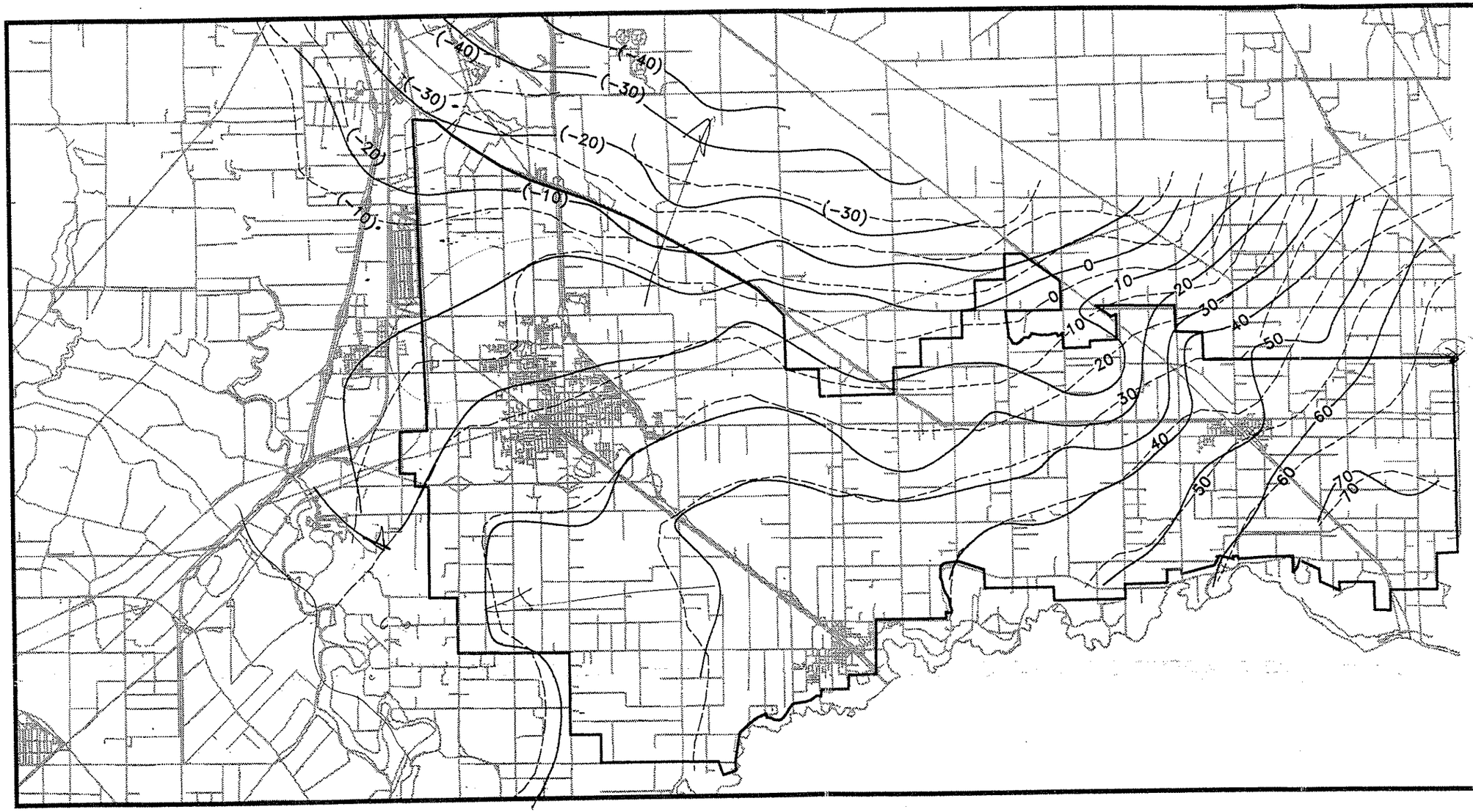
Each city within the District and the District itself provided copies of their available data. The level of detail of available data varied considerably for each city. The local, state, and federal agencies contacted have large volumes of very specific data. Only samples of this data were collected for this phase. Some of the data collected is being used in the development of the water budget. The Data Availability Matrix shown in Table 1 lists each of the agencies contacted, their contact person with phone number and the type of information available.

# TABLE 1

## SSJID GROUNDWATER MANAGEMENT PROGRAM

## DATA AVAILABILITY MATRIX

| AGENCY | CONTACT PERSON | TITLE | PHONE | FAX | GIS Mapping | Well Locations | Well logs/E-Logs | Water Levels/ Well Hydrographs | Groundwater Quality | Groundwater Pumping | Well Construction Data | Pump Tests | Ag Power Consumption Records | Abandoned Wells | Hazardous Waste Sites | Soils | Aquifer Data | Rainfall | Streamflow | Surface Water Quality | Surface Water Diversions | Crop ET | Evaporation | Ag Water Use Data | Ag Crop Data | CIMIS Data | Deep Percolation Data |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South San Joaquin Irrigation District | Rick Berzan | Engineering Department Head | (209) 823-3101 | (209) 823-8406 | • | • | | • | | • | | • | | | | | | | | | • | | | | • | | |
| City of Manteca | Jim Podesta | Deputy Director of Public Works | (209) 239-8461 | (209) 825-2333 | | | | | | | | | | | | | | | | | | | | | | | |
| | Diane Baxter | Associate Civil Engineer | (209) 239-8461 | (209) 825-2333 | | • | • | | • | | | • | | • | | | | | | | | | | | | | |
| | Mike Brinton | Director of Public Works | (209) 239-8461 | (209) 825-2333 | | | | | | | | | | | | | | | | | | | | | | | |
| | Walley Sundelin | Nolte & Associates | (209) 239-9080 | | • | | | | | | | | | | | | | | | | | | | | | | |
| City of Lathrop | Wilce Martin | Director of Public Works | (209) 858-5592 | (209) 858-5259 | | | | | • | | | | | | • | | | | | | | | | | | | |
| | Lynn Breitenbucher | | (209) 858-5592 | | | | | | | | | | | | | | | | | | | | | | | | |
| City of Ripon | Dale Ramey | Staff Engineer | (209) 599-2108 | | | • | • | | • | • | • | | | | | | | | | | | | | | | | |
| City of Escalon | Harold E. Robinson | Director of Public Works | (209) 838-3556 | | | • | | | | • | • | | | | | | | | | | | | | | | | |
| | Larry Test | (Kjeldsen-Sinnock & Associates) | (209) 946-0268 | | | | | | | | | | | | | | | | | | | | | | | | |
| San Joaquin County FCWCD | John Pulver | Water Resources Coordinator | (209) 468-3089 | (209) 468-2999 | | • | | • | | | | | | | | | | | | | | | | | | | |
| | Mike Callahan | | (209) 468-3062 | (209) 468-2999 | | | | | | | | | | | | | | | | | | | | | | | |
| San Joaquin County Public Health Services | Ray Borges | Senior Environmental Health Specialist | (209) 468-3484 | | | | | | | | | | | | • | | | | | | | | | | | | |
| | Margaret Lagorio | Lead Senior Registered Environmental Health Specialist | (209) 468-3449 | | | | | | | | | | | • | | | | | | | | | | | | | |
| Department of Water Resources | Carl Hauge | | (916) 327-8661 | | | | | | | | | | | | | | | | | | | | | | | | |
| | Toccoy Dudley | Cheif, Geology and Groundwater Section | (916) 322-7164 | | | | | • | | | | | | | | | • | • | | | | | | | | | |
| | Mark Rivera | | (916) 445-8976 | | | | | | | | | | | | | | | | | | | | | | | • | |
| | Betty Swatsenbarg | Surface and Groundwater Data Section | (916) 322-7171 | | | | • | | | | | | | | | | | | | | | | | | | | |
| Soil Conservation Service | David Simpson | District Conservationist | (209) 946-6248 | | | | | | | | | | | | • | | | | | | | | | | | | |
| National Oceanographic and Atmospheric Administration | Al Chen | | (704) 271-4800 | (704) 271-4876 | | | | | | | | | | | | | | • | | | | | | | | | |
| United States Geological Survey | John Bader | | (916) 978-4643 | | | | | | | | | | • | | | | | | • | • | | | | | | | |
| United States Bureau of Reclamation | Bob Turner | Geologist | (916) 978-4902 | | | | | | | | | | | | | | | | | | | • | • | | | | • |
| California State Regional Water Quality Control Board--Central Valley Region | Robert Evans | Sanitary Engineering Associate | (916) 255-3136 | (916) 255-3015 | | | | | | | | | | | • | | | | | | | | | | | | |
| | Cam Williams | | (916) 255-3069 | | | | | | | | | | | | • | | | | | | | | | | | | |




0 1 2
MILES

LEGEND:

GROUNDWATER EVEVATIONS SPRING 1992

GROUNDWATER EVEVATIONS FALL 1992

DISTRICT BOUNDARY

**SOUTH SAN JOAQUIN IRRIGATION DISTRICT GROUNDWATER ELEVATIONS**

FIGURE 1

SJGWEL REV 7/26/93

## SECTION 3 GROUNDWATER

This section summarizes the results of the reconnaissance level groundwater investigation. It identifies existing groundwater conditions and recent changes in ground water levels. It also includes a discussion of the groundwater levels, as well as major areas of recharge and pumping.

### Groundwater Levels

Groundwater levels within the District are not presently monitored by SSJID. San Joaquin County FCWCD aggregates water level data to create a county wide semi-annual water level map. Inside and immediately surrounding the District DWR monitors about 37 wells and the county monitors about 12 wells. These wells are used to develop the semi-annual ground water level maps. The spring and the fall water level elevations for 1992 are shown in Figure 1.

The spring 1992 water levels ranged from more than 70 feet above mean sea level in the south east corner of the District, to almost 20 feet below mean sea level in the northwest corner. The Fall 1992 water levels ranged from about 70 feet above mean sea level in the southeast corner of the District, to almost 30 feet below mean sea level in the northwest corner.

Within the District, groundwater flows generally from the southeast to the northwest. In the western end of the District groundwater flows more northernly. North of the District, groundwater flows north towards the pumping depression located southeast of Stockton. Figure 1 shows that in the area northeast of Escalon water levels declined from 5 to 20 feet between the spring and fall measurements. Northwest of Escalon water levels stayed the same or rose slightly over the same period of time. Just north of the District, water levels that were below sea level in the spring measurements decreased by another 10 feet by fall. Also, water levels in the area between Lathrop and Manteca dropped below sea level. Water levels south of Manteca and along the Stanislaus River remained relatively constant between the spring and fall measurements.

### Major Extraction Areas

**South San Joaquin Irrigation District** The District has 33 wells that have a combined pumping capacity of about 100 cfs. Most of the wells are located in the western third of the District and are operated on an as-needed basis to lower water levels below the crop root zone. The District pumps about 5500 acre-feet per year (af/yr) from these wells.

**Private Wells** Historically, groundwater has been used within the District to both supplement surface water supplies and provide the sole source of water where needed. Groundwater is the sole water source for about 9000 acres within the District. There are an undetermined number of private wells within the District which produce an estimated 21,200 af/yr of water. No maps are available showing the distribution of the private wells within the District. A detailed search of the well logs at DWR could provide this information.

**City of Manteca** A 1989 report determined that the City of Manteca's existing annual water demand was 9000 acre-feet. All of the city's water is supplied by ground-water. The data provided by the City of Manteca identifies 12 active wells, but does not

include well production data for those wells. Well numbers 12 and 15 both have production capacity of 2000 gallons per minute (gpm) and are located on the northwest end of the city. Continuous pumping of these two wells could drawdown local water levels significantly. The fall 1992 water level contours shown in Figure 1 identify an area of approximately 5 to 8 feet of drawdown since the spring 1992 water level measurements were recorded between Manteca and Lathrop. The water levels in this area have dropped below sea level. If water levels continue to decline in this area saline water will continue to move further inland in the aquifer.

**City of Lathrop** A 1989 report determined that Lathrop County Water District's existing annual water demand was 1300 acre-feet. Lathrop County Water District was taken over by the City of Lathrop in 1990. All of the city's water is supplied by groundwater.

**City of Escalon** The City of Escalon provided production data for their entire system which consists of seven wells, but no water level data was available. Five of those wells are active, and from 1984-1992 they produced about 1150 af/yr.

**City of Ripon** Between 1987 and 1992 the City of Ripon had production data for six different wells. During this time, the average annual production from theses wells was 2730 af/yr. In 1992, these wells produced 2400 acre-feet. At this time, only four of the City's wells are operational. Wells #1 and #5 were taken off-line because of high nitrate levels. Well #2 was taken off line due to high levels of trichloroethylene. Well # 3 is temporarily shut down due to the presence of coliform bacteria. Well #8 is on standby due to high levels of iron bacteria. At present, only four wells(No.'s 4,6,7, and 9) are operational.

**Industrial Uses** A 1991 report prepared for SSJID estimates industrial uses of groundwater within the District to total 3,200 af/yr.

## Recharge Areas

The groundwater under SSJID is recharged from four general sources, the Stanislaus River, groundwater inflow from the foothills area east of the District, irrigation and precipitation within the District, and recharge ponds located within the District.

**Stanislaus River** The USGS has several stream flow gages on the Stanislaus River. The two gages of interest for this study are No. 302000, Stanislaus River below Goodwin Dam, near Knights Ferry, and No. 303000, Stanislaus River at Ripon. Annual flows at these two gages from 1957 to 1991 show that about 112,000 af/yr of water is added to the river between those two points.

This additional water comes from several sources. A portion of the rain that falls on the small watersheds located between the two gages enters the river as runoff. The small watersheds adjacent to the river between the two gages totals about 89 square miles. Irrigation return flows between the two gages also contribute to the increased flow at the lower gage. The aquifer-stream interaction along the east side to the San Joaquin Valley provides a net increase to flows in the Stanislaus River between these two gages.

Along the eastern edge of the San Joaquin Valley groundwater level elevations are higher than the elevations of the water surface in Stanislaus River. This difference in head between the groundwater in the aquifer and the surface water in the river drives groundwater from the aquifer into the river. A river is called a 'gaining river' when its

flows are supplemented by groundwater. In the opposite case, water levels in the river are higher than water levels in the aquifer driving water from the river into aquifer. A river in this condition is called a 'loosing river'. In either case, the greater the head difference between the surface water and groundwater the more aquifer-stream interaction will exist.

Throughout most of SSJID the Stanislaus River is a losing stream based on water level contours from available maps. Somewhere near Escalon the river changes from a gaining stream to a losing stream. The spring 1992 water level map indicates the 60 foot elevation groundwater contour approaches the point along the Stanislaus River where the stream bed is 60 feet above sea level. At this point, where the bottom of the riverbed and the water table are about the same elevation, there is little interaction between the river and the aquifer. Upstream from here the bottom of the stream bed is generally below the local water levels, thus ground water enters the river. Downstream of this point the water table is below the stream bed resulting in water flowing from the river into the aquifer. No available information quantifies the interaction between the aquifer and the portion of the river adjacent to SSJID.

**Groundwater Inflow** Ground water inflow from adjacent areas is another possible source of ground water recharge. Ground water enters the District from the small area to the east that consists of half of Oakdale Irrigation District located north of the Stanislaus River. Also seepage from Woodward Reservoir may enter the District, although much of it probably flows north of the SSJID towards Stockton East Water District.

**Irrigation/Precipitation** Both irrigation and precipitation recharge the District's groundwater resource. The water budget developed in Section 3 suggests that up to 12,000 af/yr of precipitation percolates into the groundwater. Deep percolation of applied water contributes an additional 60,000 af/yr of water to the ground water basin.

**Artificial Recharge** Limited artificial recharge facilities are present within the District. There is one off stream storage reservoir in the SE quarter of the NW quarter of section 14 in Township 2S Range 8E, just north of he Main Distribution Canal. No data is available regarding the occurrence of recharge from this facility.

## SECTION 4 WATER BUDGET

This section summarizes the reconnaissance level water budget developed during this investigation. Data was provided by the District and from existing reports. Estimates of additional data were made where needed. The summary of the annual budget and the source of the data is shown in Table 2.

### Water Supply

The total water supply to farms within the District includes all the known sources of available water. The net available water at Woodward Reservoir is the summation of the inflow to the reservoir and gains from rainfall less the losses to evaporation and seepage. Between 1978 and 1986, the average annual inflow to Woodward Reservoir was 290,000 acre-feet. Although inflow data to the reservoir exists from 1960 to present, this period was selected because it is a recent period of normal hydrologic conditions. The seepage from Woodward Reservoir to the groundwater basin is removed from the available water supply, but it is not included in the groundwater budget because most of this water flows

TABLE 2

SOUTH SAN JOAQUIN IRRIGATION DISTRICT

WATER BUDGET

| | | WATER BALANCE | GROUNDWATER BALANCE | SOURCE OF DATA |
|---|---|---|---|---|
| **WATER SUPPLY** | | | | |
| INFLOW TO WOODWARD RESERVOIR | | 290,000 | | SSJID (1978-1986) |
| SEEPAGE FROM WOODWARD RESERVOIR* | | (30,000) | 30,000* | UMA |
| EVAPORATION FROM WOODWARD RESERVOIR | | (12,000) | | UMA |
| PRECIPITATION ONTO WOODWARD RESERVOIR | | 5,000 | | UMA |
| **NET AVAILABLE WATER AT WOODWARD** | | **253,000** | | |
| CANAL SEEPAGE | | (10,000) | 10,000 | UMA |
| CANAL EVAPORATION | | (1,000) | | UMA |
| MAIN CANAL SPILLS | | 0 | | SSJID |
| **SURFACE WATER DELIVERED TO FARM** | | **242,000** | | |
| INTERCEPTED FLOWS FROM OID | | 6,100 | | UMA |
| AGRICULTURAL GROUNDWATER PUMPING | | 26,300 | (26,300) | UMA |
| **AVAILABLE SURFACE AND GROUND WATER** | | **274,400** | | |
| TOTAL PRECIPITATION ON SSJID | 89,000 | | | UMA |
| URBAN RUNOFF | (8,000) | | | UMA |
| TOTAL PRECIPITATION ON AG AREAS | 81,000 | | | |
| EFFECTIVE PRECIPITATION | | 45,000 | | ESTIMATED AVERAGE (CVGSM) |
| DEEP PERCOLATION OF PRECIPITATION | (12,000) | | 12,000 | ESTIMATED AVERAGE (CVGSM) |
| PRECIPITATION RUNOFF | 24,000 | | | ESTIMATED AVERAGE (CVGSM) |
| **TOTAL AVAILABLE WATER SUPPLY TO FARM** | | **319,400** | | |
| **WATER DEMAND** | | | | |
| CROP ET | | (172,000) | | UMA |
| EVAPORATION FROM WATER SURFACES | | (7,800) | | UMA |
| EVAPORATION FROM IRRIGATED SOILS | | (7,000) | | UMA |
| IRRIGATION SPILLS | | (30,000) | | SSJID |
| DEEP PERCOALTION OF APPLIED WATER | | (60,000) | 60,000 | UMA |
| M&I GROUNDWATER PUMPING | 16,200 | | (13,000) | CITIES |
| WATER TABLE PUMPING | 3,400 | | (3,400) | UMA |
| INFLOW FROM STANISLAUS RIVER | | | 1,000 | ESTIMATED |
| DRAIN/TAILWATER | | (5,000) | | UMA |
| GROUNDWATER STORAGE DECLINE | 21,600 | | 21,600 | ESTIMATED |
| **REMAINING WATER** | | **37,600** | **61,900** | |
| DEEP PERCOLATION OF SURPLUS APPLIED WATER | 37,600 | | 37,600 | |
| **NET GROUNDWATER OUTFLOW** | | | **99,500** | |

NOTE: Numbers in () are negative

* SEEPAGE FLOWS NORTH OF DISTRICT(NOT INCLUDED IN GROUNDWATER BUDGET)

north away from the District towards the pumping depression south of Stockton. Evaporation and seepage losses from canals annually total about 11,000 acre-feet. The net supply of water available from Woodward Reservoir is 242,000 af/yr.

South San Joaquin Irrigation District intercepts about 6,100 acre-feet of Oakdale Irrigation District's (OID) return flows annually. These unmeasured flows consist of OID spills into the District's Main Distribution Canal.

Pumping data available from 1980-1986 indicates that all irrigation wells in the District produce an annual average of 26,300 acre-feet of water. During this period, District wells produced an average of about 5,500 acre-feet, while privates wells averaged 20,800 acre feet.

Total precipitation on SSJID is approximately 15 inches per year, or 89,000 acre-feet. Of this, about 8,000 acre-feet falls on urbanized areas and is lost as urban runoff. The remaining 81,000 acre-feet of precipitation falls on agricultural and open areas.

The estimates of effective precipitation, deep percolation of precipitation and precipitation runoff are based on recent runs of the Central Valley Ground-Surface Water Model originally developed by Montgomery Watson in 1989 for the U.S. Bureau of Reclamation, California Department of Water Resources, California State Water Resources Control Board, and the Contra Costa Water District, California. These values are based on the soil moisture budget for DSA 49B which includes the South San Joaquin Irrigation District, Oakdale Irrigation District, and Modesto Irrigation District.

Approximately 56 percent of the precipitation that falls on the agricultural lands within the District contribute the effective precipitation. Effective precipitation is the precipitation that falls during the growing period of the crop that is available to meet the evapotranspiration needs of the crop. Approximately 15 percent of the precipitation that falls on the agricultural lands within the District contributes to the deep percolation of the groundwater basin. Deep percolation is the amount of water that percolates through the top soil and enters the unsaturated zone. Approximately 29 percent of the precipitation that falls on the agricultural lands within the District results in direct runoff.

As shown on Table 2, the total available water to farms within the District is 319,400 af/yr.

**Water Demand**

The water demands includes all the known water uses and losses both retrievable and irretrievable that occur on the farms within the District. As shown in Table 2, most of this information is from existing reports.

Crop evapotranspiration or consumptive use is the amount of water used by the vegetative growth of a plant in transpiration, building of plant tissue, and evaporation from adjacent soil or intercepted precipitation on the plant foliage in any specified time. Crop evapotranspiration accounts of 172,000 acre-feet of the total water used on the farms. This is the requirement for the plant only and does not include additional water needed for runoff, deep percolation or evaporation.

Approximately 7,900 acre-feet of water evaporates from water surfaces within the District. Most of this occurs along the Main Distribution Canal which has a surface area of about 170 acres. Approximately 7,000 acre-feet of water evaporates from irrigated

soils. This is separate from the evapotranspiration requirement that accounts for evaporation near the plant.

Prior to installing the SCADA(Supervisory Control And Data Acquisition) system on the Main Distribution Canal(MDC) in 1989, the District spilled water from the canal into the Stanislaus River via the Escalon and Ripon spillways. Since that time, the District has not spilled water from the MDC. In addition to the District's flows being restricted from being spilled into the river, any water spilled into the MDC by OID is now put to beneficial use within the District. The spills component was included in the budget even though it is zero because it accounts for a significant change in water use from previous years.

Deep percolation of applied water is estimated to range from 35,000 to 75,000 acre-feet per year. This along with deep percolation of precipitation are the primary sources of recharge to the groundwater reservoir within the District.

Approximately 5,000 acre-feet of irrigation tailwater is lost to drains or rivers each year. This water may be re-used by others further downstream, but it has no additional use within the District.

The water budget shows that approximately 37,600 acre-feet of irrigation water is applied to the fields that is not needed for crop development. Much of this water percolates into the ground water basin.

**Groundwater Budget**

Table 2 also includes a reconnaissance level groundwater budget. This was completed separately to show how it is impacted by the groundwater pumping and recharge. The components are included as listed in Table 2. Table 2 does not account for groundwater inflow or outflow, but does address the net change that occurs within the District. Some groundwater does enter the basin from the foothills to the east.

Seepage from Woodward Reservoir contributes up to 30,000 acre-feet of water to the groundwater basin, but most of the recharge flows north of the District and so it is not added to the groundwater supplies within SSJID. Canal seepage within the District occurs primarily along the unlined section of the Main Distribution Canal. Ponding tests along the canal by SSJID indicate approximately 10,000 acre-feet of water percolates to the groundwater basin each year.

Approximately 26,300 acre-feet of groundwater is extracted every year within the District for agricultural use.

Deep percolation of precipitation and deep percolation applied water contribute 12,000 and 60,000 acre-feet of water, respectively, to the groundwater basin each year.

Municipal and industrial groundwater pumpage is focused in the Cities of Manteca, Escalon, and Ripon. These cities rely entirely on groundwater to meet their water needs. Based on recent information provided by the cities, M&I users utilize about 16,200 af/yr of groundwater. Shallow groundwater table pumping is present on the west side of the District, especially in the areas just south of Manteca. Approximately 3,400 acre-feet of water is pumped in order to lower the water table in that area below the root zone of crops.

As mentioned earlier, the Stanislaus River gains water between the gage at Goodwin Dam and the gage at Ripon. Most of this gain is believed to take place east of the District. Within the District, the water table gently slopes away from the river suggesting that the river is losing water to the river, but not very rapidly. The amount of water gained from the river varies with changing water levels. Water levels did not noticeably change along the Stanislaus River between the spring and fall 1992 measurements, although water levels did decline slightly throughout the remainder of the District during this time. The amount of inflow from the Stanislaus River is estimated to be about 1000 af/yr.

The groundwater balance shows approximately 37,600 acre-feet is added to the groundwater basin below the District from the deep percolation surplus applied water.

The San Joaquin County Flood Control and Water Conservation District's spring reports include the water level change averaged over the entire district for SSJID. The average water level in the District declined by 2.5 feet between the spring 1991 and spring 1992 measurements. Assuming a 12 percent specific yield for the District, this results in a decline in groundwater storage of 21,600 acre-feet. The specific yield is described as the aquifers capacity to store or yield water and is the result of filling and draining pore space. For an unconfined aquifer, it is the volume of water released from storage per unit horizontal area of aquifer per unit decline in water table.

The net groundwater outflow from the District is the net change of all the inputs and outputs to the groundwater basin from within SSJID's service area. Table 2 shows that about 99,500 af/yr leaves the District. Much of this water flows north out of the District toward the pumping depression south of Stockton. Some of the water flows westward towards the San Joaquin River, but the flows area less and at a much slower rate due to the more gradual groundwater gradient.

## SECTION 5 SUMMARY/RECOMMENDATIONS

A Groundwater Management Plan (GMP) provides a comprehensive evaluation of the groundwater resources of an area. It also provides a plan of action to put the resource to its best possible beneficial use. The following include several goals for a GMP: maximizing the beneficial use of water resources in the basin, protecting and enhancing water quality, and coordinating all activities with all local, state and federal interests.

Maximizing the beneficial use of water resources within a basin includes but is not limited to: developing a conjunctive use program, increasing the capacity of recharge facilities, and defining the hydrogeology of the basin to better assess the groundwater resources to make use of basin yield and storage space. Protecting and enhancing both surface and groundwater quality includes an active water sampling program as well as proactive program of locating potential sources of contamination from abandoned wells, leaking underground storage tanks, fertilizer/pesticide spills, and hazardous waste sites. To do this effectively, water suppliers need to maintain good working relationships with regulating agencies at the local, state, and federal levels, urban and agricultural water users, and other water purveyors within the basin.

AB-3030 includes a list of 12 components that may be incorporated into a Groundwater Management Plan. Table 3 describes each component as it effects SSJID and provides an assessment of the populations affected and the activities involved in addressing them in a GMP.

TABLE 3

SOUTH SAN JOAQUIN IRRIGATION DISTRICT

GROUNDWATER MANAGEMENT ACTIVITIES MATRIX

| Groundwater Management Plan Components | Description | Populations Affected | Recommended Groundwater Management Activities |
|---|---|---|---|
| Saline Water Intrusion | In the western areas of the District, adjacent to Lathrop, lowering groundwater levels below sea level will result in saline water from the Delta entering the groundwater. Similar conditions exist to the north of the District in the central part of the County. | On a near term basis, the potable water supplies for Manteca Lathrop could be adversely effected.<br><br>On a long term basis, agricultural irrigators using groundwater in areas subject to salt water intrusion, could see a decline in crop production resulting from increased salt levels. | Reduce groundwater pumping and maximize beneficial use of surface water for municipal/ industrial purposes in western and northern areas.<br><br>Cooperate with Manteca and Lathrop on groundwater quality monitoring program.<br><br>Cooperate with San Joaquin County Flood Control and Water Conservation District (SJ CFCWCD) in monitoring groundwater levels in western area of the District.<br><br>Maintain positive groundwater gradient from District toward Delta.<br><br>Evaluate development of a groundwater recharge program in the northwest portion of the District. |
| Identification and Management of Well Head Protection Areas and Recharge Areas | Water percolating into the soil containing animal waste, fertilizer, pesticides, residuals from leaking tanks and other sources of contaminates can contaminate groundwater supplies. This is of particular concern in areas of highly permeable soils and near abandoned wells. | Both agricultural and municipal/industrial users can be affected by groundwater contamination. The degree to which these users are affected is dependent on the type and concentration of the contamination. | Locate and identify abandoned wells within and adjacent to the District. Coordinate with State and local agencies regarding proper abandonment.<br><br>Coordinate with local agencies, such as San Joaquin County Public Health Service Environmental Health Division (SJCPHS) and California Regional Water Quality Control Board (RWQCB) Region 5 on the identification, monitoring, and cleanup of contaminated areas.<br><br>Identify areas with high recharge potential. Monitor land use activities in those areas. Coordinate with land use planning agencies regarding proposed activities which could effect groundwater recharge. Cooperate with those agencies responsible for clean-up of contaminated soils and groundwater. |
| Regulation of Migration of Contaminated Groundwater | Contaminated groundwater can move from the source of the contamination into other areas. If contamination is allowed to spread to larger areas, then larger areas could become contaminated. | Depending on the type and concentration of the contaminant, agricultural and municipal/industrial water uses who rely on the groundwater, could be adversely affected. | Coordinate and cooperate with the Federal, State, and local agencies responsible for monitoring and clean-up of contaminated groundwater. |
| Administration of a Well Abandonment and Well Destruction Program | Wells can serve as a conduit for contamination allowing rapid vertical vertical movement of contaminants between aquifers. Upon abandonment, wells should be properly destroyed to minimize the movement of contaminants. | Depending on the type and concentration of the contaminant, agricultural and municipal/industrial water users, who rely on the groundwater, could be adversely affected. | The California Department of Water Resources (DWR) has statewide program for monitoring well abandonment and destruction. The SJCPHS has also developed well abandonment standards. The District should coordinate and cooperate with DWR and SJCPHS in this effort. Any abandoned wells found in the District should be reported to DWR and SJCPHS. |
| Mitigation of Overdraft Conditions | Overdrafting occurs when over extended periods of time, more groundwater is extracted than is recharged through natural and artificial means. One of the noticeable results of overdrafting is a decline in groundwater levels. This condition is occuring in the central part of the County. | Declining groundwater levels affect both agricultural and municipal/industrial groundwater users. Lower groundwater levels can result in higher pumping costs, water quality problems and land subsidence. | Reduce groundwater pumping and maximize beneficial use of surface water in through water transfers to overdrafted areas.<br><br>Coordinate and cooperate with Oakdale Irrigation District (OID) and SJCFCWCD in the monitoring of groundwater levels.<br><br>Monitor groundwater levels through a semi-annual program of measuring the water level at selected wells.<br><br>Evaluate development of a groundwater recharge program in effected areas. |

TABLE 3

SOUTH SAN JOAQUIN IRRIGATION DISTRICT

GROUNDWATER MANAGEMENT ACTIVITIES MATRIX

| Groundwater Management Plan Components | Description | Populations Affected | Recommended Groundwater Management Activities |
|---|---|---|---|
| Replenishment of Groundwater | Groundwater is naturally replenished through precipitation and recharged from surface waters. This natural process can be augmented through a managed program of artificial recharge. | All segments of the population who use groundwater can benefit from groundwater recharge activities. Groundwater recharge can prevent and/or mitigate overdrafting and saline water intrusion. | Identify those areas having soils suitable for groundwater recharge.<br>Develop and implement groundwater recharge programs.<br><br>Develop cooperative agreements with the landowners to facilitate groundwater recharge.<br><br>Cooperate and coordinate with land use planning agencies to maintain these areas in uses that facilitate recharge, such as agriculture and open space. |
| Groundwater Level and Storage Monitoring | Groundwater levels are good indicators of recharge and extraction activities and in some locations, can be used to identify areas susceptible to water quality problems. | All segments of the population who use groundwater can potentially benefit from the information obtained from monitoring groundwater levels. | Coordinate and cooperate with OID & SJCFCWCD in the monitoring of groundwater levels.<br><br>Monitor groundwater levels through a semi-annual program of measuring the water level at selected wells. |
| Facilitate Conjunctive Use Operations | Conjunctive use is the coordinated and planned operation of both surface and groundwater resources to meet water requirements in a manner whereby water is conserved. | All segments of the population who use water, either groundwater or surface water are affected by and will benefit from conjunctive use operations. | Coordinate and cooperate with other agencies and local water users who rely on ground-water in the development of alternate water supplies.<br><br>Maximize the beneficial use of surface water by coordinating and cooperating with other agencies such as OID & USGS in monitoring surface water quality in the Stanislaus River.<br><br>Develop and implement a plan for the coordinated operation of groundwater and surface water systems. |
| Identification of Well Construction Policies | Properly planned, designed and constructed wells provide efficient extraction of groundwater while minimizing potential groundwater contamination problems and reducing pumping costs. | Both agricultural and municipal/industrial water users, who rely on groundwater are positively effected by the construction of properly designed wells. | Support the requirements of DWR and SJCPHS in enforcing well construction standards. |
| Construction and Operation of Groundwater Contamination Clean-up, Recharge, Storage, Conservation, Water Recycling and Extraction Projects. | Proper management of the groundwater resources may require the construction and operation of physical facilities to ensure beneficial use to users. | All segments of the population within the District could be effected by actions taken to properly manage the groundwater. | Coordinate and cooperate with the Federal, State, and local agencies responsible for monitoring and clean-up of contaminated groundwater.<br><br>Evaluate development of a groundwater recharge program throughout the District.<br><br>Evaluate opportunities to participate in water conservation activities, use of reclaimed water, wastewater reclamation, and similar projects. |
| Development of Relationships with Federal and State Regulatory Agencies | Various Federal and State agencies are charged regulating activities that could effect the groundwater. Cooperating with these agencies keeps the District informed about the activities of these agencies and allows the District's interests to be considered by the regulatory agencies. | All segments of the population within the District could be affected | Actively establish agreements with other agencies involved in activities which effect the water supplies and water uses in the area. |
| Review of Land Use Plans and Coordination with Land Use Planning Agencies to Access Activities which Create a Reasonable Risk Groundwater Contamination | Land use planning agencies, such as the Cities and San Joaquin County can take actions which affect proper management and use of the groundwater. Cooperating with these agencies and reviewing land use plans can minimize activities which may have negative impacts on the groundwater. | All segments of the population within the District can be effected by this activity. | Actively established agreements with other agencies involved in activities which effect the water supplies and water usage in the area |

Some of the recommended activities to be initiated by the District to complete their Groundwater Management Plan include:

- Cooperating with Manteca, Lathrop, DWR, and SJCFCWCD on groundwater quality monitoring in the northwest part of the District. This area has been identified in SJCFCWCD's fall reports as areas of elevated total dissolved solids (TDS) and chlorides. This increase is due to declining water levels in the area inducing saline water from the delta to move further inland.

- Cooperating with SJCFCWCD in monitoring groundwater levels throughout the District, especially in areas where existing data is limited. This may include monitoring existing wells not previously included in the program, or drilling new monitoring/production wells in locations where data is limited and no existing wells are available. This will help define the annual changes in the groundwater levels.

- The District needs to identify areas of potential groundwater recharge. Soil types, present and future land use, and local groundwater conditions will locate the areas in greatest need of artificial recharge and those areas with the greatest recharge potential. This is especially important in the northwest corner of the District where water levels are below sea level as shown in Figure 1.

- The District needs to develop programs which maximize the beneficial uses of water by transferring surface water to overdrafted areas that primarily rely on groundwater in attempt to reduce groundwater pumping in those areas.

- Locate abandoned wells within the District and coordinate their destruction and removal with San Joaquin County Public Health Services and Department of Water Resources.

- Coordinate with local, state, and federal agencies responsible or monitoring and clean-up of contaminated groundwater.

- Develop agreements between water users to reduce groundwater pumping and maximize beneficial use of surface water through water transfers to overdrafted areas.

- Maximize the beneficial use of surface water by coordinating and cooperating with other agencies such as OID and USGS in monitoring surface water quality in the Stanislaus River.

- Evaluate opportunities to participate in water conservation activities, use of reclaimed water, wastewater reclamation, and similar projects.

These area the types of activities that need to be initiated but not necessarily completed prior to adopting a Groundwater Management Plan.

93063207

SAN JOAQUIN COUNTY
RECORDER'S OFFICE
JAMES M. JOHNSTONE
93 MAY 28 AM 11:24
RECORDED AT REQUEST OF
IRRIGATION DISTRICT
FEE EXEMPT FROM FEE

3

COPY

AFTER RECORDING MAIL TO:

SOUTH SAN JOAQUIN IRRIGATION DISTRICT
11011 EAST HIGHWAY 120
MANTECA, CA 95336

RESOLUTION NO. 93-11-W

RESOLUTION OF INTENTION
TO ADOPT A GROUNDWATER MANAGEMENT PLAN FOR THE
SOUTH SAN JOAQUIN IRRIGATION DISTRICT

PREAMBLE,

WHEREAS, South San Joaquin Irrigation District (SSJID) is a local public agency, established in the year 1909, and

WHEREAS, SSJID is composed of approximately 72,000 acres of land and said lands require water for municipal and industrial purposes, and irrigation, and

WHEREAS, SSJID is responsible for ensuring the residents, businesses and farms in its service area to receive the water necessary to sustain their life and livelihood, and

WHEREAS, SSJID delivers primarily Stanislaus River water to its customers and supplements this source with groundwater and reclaimed water, and

WHEREAS, SSJID has an ongoing groundwater monitoring program and has conducted groundwater studies within its boundaries for approximately 70 years, and

WHEREAS, groundwater is a valuable resource which SSJID does monitor and may need to be managed, and

WHEREAS, in recognition of the value of groundwater as a resource, the California State legislature passed AB 3030, which encouraged local public water delivery agencies to develop and implement groundwater management plans, and

WHEREAS, AB 3030 encourages local agencies to engage in conjunctive use of surface and groundwater so as to assure the wise use of both, and

WHEREAS, in keeping with the purpose of AB 3030 to gather information to understand groundwater supplies and to promote wise use of the water resources, SSJID intends to develop, adopt and implement a groundwater management plan pursuant to AB 3030, and

WHEREAS, AB 3030 provides the regulatory framework for the adoption of a groundwater management plan, and SSJID concurs with the requirements of this framework by stating the following:

1. SOUTH SAN JOAQUIN IRRIGATION DISTRICT (SSJID) is a local public agency that provides water service to the South San Joaquin County area.

2. SSJID's service area includes a portion of the Eastern San Joaquin County Basin, as identified in the Department of Water Resources Bulletin No. 118.

3. The groundwater basin in SSJID's service area is not currently subject to a groundwater management plan judgements, or decrees, nor is it currently subject to the authority of a watermaster.

4. Under the provisions of AB 3030, SSJID is authorized to adopt and implement a plan to manage the groundwater in its service area.

5. The definitions relevant to the adoption of a groundwater management plan are as follows:

   **GROUNDWATER BASIN:** is any basin identified in the Department of Water Resources Bulletin No. 118, dated September 1975, and any amendments to that bulletin, but does not include a basin in which the average well yield is less than 100 gallons per minute.

   **GROUNDWATER:** is all water beneath the surface of the earth within the zone below the water table in which the soil is completely saturated with water, but does not include water which flows in known and definite channels.

   **GROUNDWATER MANAGEMENT PROGRAM:** is a coordinated and ongoing activity undertaken for the benefit of a groundwater basin or a portion of a groundwater basin, pursuant to a groundwater management plan.

   **GROUNDWATER MANAGEMENT PLAN:** is a document that describes the activities intended to be included in the groundwater management program.

6. The objective of SSJID's groundwater management plan is to monitor and analyze groundwater use and trends and recommend any necessary actions for wise use of groundwater resources in the service area.

7. This plan may include, but is not limited to, the following activities:

   * Control of saline water intrusions;
   * Identification and management of wellhead protection areas and recharge areas;
   * Identification of well construction policies;
   * Monitoring of groundwater levels and storage;
   * Facilitating conjunctive use operations;
   * The development of relationships with state and federal agencies that regulate groundwater issues; and

* The review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination.

8. In developing and implementing a plan, SSJID will take into account the plans's impact on business activities and specifically its impact on agricultural activities.

9. In compliance with AB 3030, SSJID will meet at least once per year to coordinate its groundwater management plan with any other entity in the Eastern San Joaquin County Basin which has also prepared such a plan.

10. All provisions of SSJID's groundwater management plan will be in compliance with the requirements of AB 3030.

PASSED AND ADOPTED at the regular meeting of the Board of Directors of South San Joaquin Irrigation District on the 13th day of April, 1993, by the following vote:

Ayes: DeGroot Haworth Schulz Van Groningen Van Rys
Noes: None
Absent: None

ATTEST: I hereby certify that the foregoing Resolution was duly made, seconded and adopted by the Board of Directors of South San Joaquin Irrigation District at a regular meeting of this Board held April 13, 1993.

Richard Martin

Richard Martin, Secretary to the Board of Directors of the South San Joaquin Irrigation District